

Amendments to the Drawings:

The drawing sheet attached in connection with the above-identified patent application containing Figure 8 is being presented as a replacement drawing sheet to be substituted for the previously submitted drawing sheet.

The arrow associated with reference numeral 720 in Figure 8 has been repositioned to more clearly indicate the section of the drawing associated with that reference numeral.

REMARKS

The Applicant respectfully requests reconsideration of the present application in view of the amendment provided above and in view of the reasons that follow. Claims 68 and 77 have been amended. Claims 23-30 and 47-78 remain pending in this application (claims 23-30 being withdrawn). A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate status identifier for each.

Drawings

In section 7 of the Office Action, the drawings are objected to as failing to comply with 37 C.F.R. § 1.84(p)(4) because reference characters 720 and 705 have both been used to designate the same element in Figure 8. Fig. 8 has been amended as described above such that the arrow associated with reference numeral 720 more clearly points to the element associated with the reference numeral. Accordingly, the Applicant respectfully requests the withdrawal of the drawing objection.

Claim Rejections – 35 U.S.C. § 112, ¶ 1

In section 9 of the Office Action, claims 55-64 are rejected under 35 U.S.C. § 112, ¶ 1 as failing to comply with the enablement requirement. The Office Action states that “[i]t is not clear how could the interference be caused along the axis.” The Applicant respectfully submits that he may act as his own lexicographer (see Manual of Patent Examining Procedure § 2111.01) and that it is sufficiently clear to one of ordinary skill in the art from the language of claim 55, the specification (e.g., page 5, line 20 – page 6, line 12 of the original specification), and the drawings (e.g., Figs. 2-5 and 7) how the optical conduit receiving output signals is positioned with respect to a predetermined axis associated with maximum interference of optical signals due to the configuration of the interference region. The Applicant submits that any standard optic textbook definition of “interference,” to the extent such definition is inconsistent with the use of “interference” in the specification, is subordinate to the use of interference as described in the specification as cited above.

Further, the Applicant is uncertain what is meant by the Examiner's statement that "It is possible to define a direction along such the constructive interference occurs." Assuming that the Examiner meant it is *not* possible to define a direction along **an axis**, the Applicant asserts that the claim language does not recite defining a direction. Claim 55 recites "a predetermined axis in the interference region along which maximum interference of optical signals in the interference region is caused."

Regardless, the Applicant believes that the subject matter was described in the specification in such a way as to enable one skilled in the art to which it pertains to make and/or use the invention. Accordingly, the Applicant respectfully requests withdrawal of this rejection of claims 55-64 under 35 U.S.C. § 112, ¶ 1.

In section 10 of the Office Action, claims 68 and 77 are rejected under 35 U.S.C. § 112, ¶1 as failing to comply with the enablement requirement. Claims 68 and 77 have been amended to recite that "the optical processor is configured of NOT (inverter) gates or NOT AND (NAND) gates" The Applicant respectfully requests entry of the amendment and withdrawal of the rejection of claims 68 and 77 under 35 U.S.C. § 112, ¶ 1.

Claim Objections

In section 11 of the Office Action, claims 47-78 are objected to because of informalities. The Examiner indicated that the “the phrase ‘the periphery being a single, outer periphery’ recited in amended claims 47, 55, 65, and 69 is confusing and indefinite for it is not clear what does this phrase mean?” and that each of the interference regions has outer periphery made up of two parts, (element 760 and element 705). How do these two element being considered as single periphery?” The Applicant respectfully submits that claims 47, 55, 65, and 69 recite a substrate and that substrate 705 is defined in the specification and shown in the figures with reference to Fig. 7. The claims describe an exterior periphery of another material that is a single, **outer** periphery. Accordingly, the Applicant respectfully requests withdrawal of the objections to claims 47-78.

Claim Rejections – 35 U.S.C. § 103(a)

a. Rejection of claims 47-58 and 63-78 based on Usagawa et al.

In section 13 of the Office Action, claims 47-58 and 63-78 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Usagawa et al. (U.S. Patent No. 5,233,205).

i. Claims 47-54

The Applicant respectfully submits that Usagawa et al. fails to teach, disclose, or suggest all of the elements of claim 47 as combined therein. Usagawa et al. does not teach, disclose, or suggest “an optical layer overlaying the substrate the optical layer comprising a second material ... wherein the interference region comprises the second material and is bounded on its periphery by material other than the second material, the periphery being a single, outer periphery such that only the interference region is within the periphery” as included in the combination of elements of claim 47.

The Examiner asserted that “as shown in Figure 5A of Usagawa et al. the periphery that surrounds the interference region 52 is a single outer periphery the same way as the instant application shows in Figure 8.” However, Usagawa et al. makes it clear that “FIG. 5a is a perspective view of a GaAs wave guide 52 surrounded by the $\text{Al}_x\text{Ga}_{1-x}\text{As}$ 50, 51.” Usagawa et al. does not define a wave guide as an interference region. Further, the interference region referred to by the Examiner, as shown in Figures 1A-1G, includes interior peripheries. Accordingly, Usagawa et al. does not teach or suggest a single outer periphery such that **only** the interference region is within the periphery.

Thus, Usagawa et al. fails to teach, disclose, or suggest “the interference region comprises the second material and is bounded on its periphery by material other than the second material, the periphery being a single, outer periphery such that only the interference region is within the periphery” as included in the combination of elements of claim 47.

Further, the Office Action indicates some similarities between the quantum wave circuit described by Usagawa et al. and the optical logic circuit recited by the Applicant. The Applicant, however, disagrees with this interpretation. The optical logic circuit is based upon propagation of photons to the material and the destructive interference of wave fronts of photons propagating through the material not through a propagation of electrons and holes through a material. The Office Action also states that the quantum well structures require instant light to excite the electron and hole carriers. However, there are ways in which the electron hole carriers may be induced as opposed to light and the inducement of the electronic hole carriers by light is not described, taught, or suggested by Usagawa et al. Further, although what is described by Usagawa et al. is wave-like behavior of electron waves, light is not propagated through the material causing destructive interference as recited in the claims. Accordingly, the equivalence of an electron wave and a light wave has not been established by Usagawa et al. The Examiner has not addressed this difference.

Accordingly, the Applicant respectfully requests that the rejection of claim 47 under 35 U.S.C. § 103(a) be withdrawn. Additionally, claims 48-54 depend from claim 47 and are thus patentable over Usagawa et al. for at least the same reasons as claim 47. Accordingly, the Applicant further requests that the rejection of claims 48-54 under 35 U.S.C. § 103(a) be withdrawn as well.

ii. Claims 55-58

With regard to claim 55, the Applicant respectfully submits that independent claim 55 is allowable for substantially the same reasons as claim 47. Accordingly, the Applicant respectfully requests that the rejection of claim 55 under 35 U.S.C. § 103(a) be withdrawn. Additionally, claims 56-58 depend from claim 55 and are thus patentable over Usagawa et al. for at least the same reasons as claim 55. Accordingly, the Applicant further requests that the rejection of claims 56-58 under 35 U.S.C. § 103(a) be withdrawn as well.

iii. Claims 65-68

With regard to claim 65, the Applicant respectfully submits that claim 65 is allowable for substantially the same reasons as claim 47. Accordingly, the Applicant respectfully requests that the rejection of claim 65 under 35 U.S.C. § 103(a) be withdrawn. Additionally, claims 66-68 depend from claim 65 and are thus patentable over Usagawa et al. for at least the same reasons as claim 65. Accordingly, the Applicant further requests that the rejection of claims 66-68 under 35 U.S.C. § 103(a) be withdrawn as well.

iv. Claims 69-78

With regard to claim 69, the Applicant respectfully submits that claim 69 is allowable for substantially the same reasons as claim 47. Accordingly, the Applicant respectfully requests that the rejection of claim 69 under 35 U.S.C. § 103(a) be withdrawn. Additionally, claims 70-78 depend from claim 69 and are thus patentable over Usagawa et al. for at least the same reasons as claim 69. Accordingly, the Applicant further requests that the rejection of claims 70-78 under 35 U.S.C. § 103(a) be withdrawn as well.

b. Rejection of claims 59-62 based on Usagawa et al. in view of Logan et al.

In section 11 of the Office Action, claims 59-62 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Usagawa et al. in view of Logan et al. (U.S. Patent No. 3,837,728). The Applicant respectfully submits that the claim rejections to claims 59-62 have been addressed because all of the claims 59-62 depend from independent claim 55 which is allowable. Therefore, claims 59-62 are believed to be allowable for at least the same reasons as claim 55. Accordingly, the Applicant further requests that the rejection of claims 59-62 under 35 U.S.C. § 103(a) be withdrawn as well.

Conclusion

The Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

If any extensions of time are needed for timely acceptance of papers submitted herewith, the Applicant hereby petitions for such extension under 37 C.F.R. § 1.136 and authorizes payment of any such extensions fees to Deposit Account No. 06-1447.

Respectfully submitted,

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